FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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EDITORIAL COMMENT.

MONDAY of this week marked an important milestone in the progress of aviation. On December 17, 1903, Orville Wright made the first free flight in history on a power-driven aeroplane. Previous to that date the Wright brothers had made innumerable flights on their biplane gliders, but it was not until the date mentioned that they considered themselves sufficiently skilled in the control of a machine to venture the attempt at power-driven flight. Theirs was not a sudden spectacular leap into fame, but a steady, painstaking research, progressing step by step as knowledge and experience were gained. It is a significant fact that the problem confronting the Wright brothers was not so much the possibility of dynamic flight as it was how to control their machines. Today, twenty years later, that is still one of our most important problems, with the difference that, whereas in 1903 it was a question of control during straightforward flight, the problem has now been reduced to one of attaining control at low speeds and large angles of incidence.

Twenty Years

We cannot refrain, in connection with this first power-driven flight, from referring to the comments made upon it in our precursor and sister journal, *The Automotor Journal*, of December 26, 1903. The article was headed "The Empire of the Air: An Important Step Forward," and read in part as follows:—

"A cynic has observed that the joys of successful prophesy are among the most unalloyed that are given to mankind. At present we are enjoying these delights to the full. Dealing on September 19 (1903) with the problem of flight generally, we referred to the brilliant experiments of the brothers Wright in North Carolina, which we have recorded and illustrated from time to time in the pages of the Journal. On that occasion we made the following remarks:—'They are gradually increasing the lifting power of their aeroplanes, and any day we may hear of their putting on a motor and propeller, and actually accomplishing free, independent flight. The empire of the air is still to be conquered, but we have certainly got a

further glance into the promised land than we have ever had before.'

"On referring to the same subject on October 3 (1903) we added :—'We heartily trust that at an early date the Wrights may consider themselves sufficiently skilful to attempt experimenting with their latest type of machine with a motor and propeller attached.'

"This prophesy now appears to have been completely fulfilled. The brothers Wright have attached to their aeroplane a motor-driven propeller, and, utilising their enormous and unique experience of how to manipulate the aeroplane under the varying stresses and strains to which it is subjected, by what Mr. Chanute has graphically described as 'the whirling billows of air' that constitute a wind, their machine has successfully accomplished a free, independent flight."

In spite of scepticism on every hand, not to say actual hostility, towards the new form of locomotion, our sister journal *The Automotor Journal* continued to give full accounts of the progress of flying, and to express its faith in the future of flying. At the end of 1908 FLIGHT was founded as a separate journal, the volume of aviation matter which was considered worthy of publication having grown to such an extent as to make it impossible to do it justice in a confined section of another paper. And here we are. Twenty years and more ago we were proclaiming our faith in the future of flying. Today we are doing the same, although even now people are occasionally met who profess that they can see no future for aviation, at any rate outside military aviation.

The progress that has been made during the twenty years that have lapsed since the Wrights' epoch-making episode has been enormous, but as yet we are far from the end. We have solved many of the problems, but at least as many remain unsolved, or, at any rate, partly solved. That they will be solved we have not the slightest doubt, but they will be solved by the same methods by which the Wright brothers succeeded: by careful and painstaking work, step by step.

On December 17, 1903, Orville Wright made four flights, the longest of which lasted 59 seconds and covered a distance of about 870 ft. The machine used was a biplane, with a wing span of 40 ft. and an area of 500 sq. ft. The weight was 750 lbs. and the engine, which was also built by the Wright brothers, developed 12 h.p. Thus the wing loading was 1·5 lbs./sq. ft., and the power loading 62·5 lbs./h.p. A starting rail with a dropping weight was used for getting the machine off the ground. There is thus considerable similarity to some modern light 'planes, in which rubber cord catapults are used for starting, and in which the wing loading is light and the power loading high. The maximum speed of that early Wright was probably not far in excess of 35 m.p.h. Today, with a power loading of something like 25 lbs./h.p. and a wing loading of about 3 lbs./sq. ft., we can fly at between 60 and 70 m.p.h. There is this great difference between the early Wright and the modern low-powered machine that, whereas the speed range of the Wright was extremely small, that of the modern light 'plane is very considerable, the top speed being certainly twice to two and a half times the landing speed. Also, the early machine was very nearly tangent—in other words, had practically no power reserve—whereas nowadays a light 'plane has at least 50 per cent. of its power in reserve. We mention these facts lest some should think that as regards aerodynamic efficiency no progress can have been made since the Wrights originally succeeded in carrying as much as 62½ lbs. per h.p.

The strides made during the twenty years have been enormous. The speeds have gone up from 35 m.p.h. to 266 m.p.h., and the load-carrying capacity from one man (the pilot) to several tons. This progress has not been made without sacrifice, and many are those who have fallen by the way, from Lieut. Selfridge, who was the first man to be killed on a power-driven aeroplane (one of the early Wrights), to his compatriot Mr. Lawrence Sperry, whose loss must now, we fear, be assumed and mourned. It is not possible to rejoice over the enormous progress made without being saddened by the price which has had to be paid, and in honouring in our thoughts this week that great pioneer who still survives, Mr. Wilbur Wright, and his sister and faithful helper, Miss Katherine Wright, we must not forget to hold in the highest respect those who have paid with their lives in the seeking of the conquest of the air. As a matter of fact, of course, very considerable progress has been made, although it must be frankly admitted that by far the greatest single factor in attaining modern performances has been the development of the petrol engine.

IMPERIAL AIR TRANSPORT COMPANY

Appointment of Government Directors

THE agreement which has been entered into between His Majesty's Government and the British, Foreign and Colonial Corporation, Ltd., for the establishment of an Imperial Air Transport Company provides for the appointment by the Government of two directors to the Board of the projected Company, and in accordance with that provision His Majesty's Government has decided to appoint Sir Herbert Hambling and Major J. W. Hills to be the Government directors, subject to the satisfactory flotation of the Company. These gentlemen will join the Board after the allotment of shares.

Sir Herbert Hambling is Deputy-Chairman of Barclays Bank, and President of the Institute of Bankers. During the War he served as Finance Member of Council at the Ministry of Munitions. In January of this year he was appointed by the Secretary of State for Air to be Chairman of the Civil Air Transport Subsidies Committee, which was set up "to consider the present working of the scheme of cross-Channel subsidies and to advise on the best method of subsidising Air Transport in future." Sir Herbert Hambling's Committee, after careful investigation of the present system of air transport, recommended the establishment of one national company on the lines which have been adopted by the Government in the agreement which has been entered into with the British, Foreign and Colonial Corporation.

Major J. W. Hills was Financial Secretary to the Treasury in Mr. Bonar Law's Government. In the earlier part of the War he served with the 4th Battalion, Durham Light Infantry, and later commanded the 20th Battalion of the same regiment. At a later stage he became an additional Member of Council in the Ministry of Munitions. He had been a director of the Midland Railway, and was for many years member for Durham.

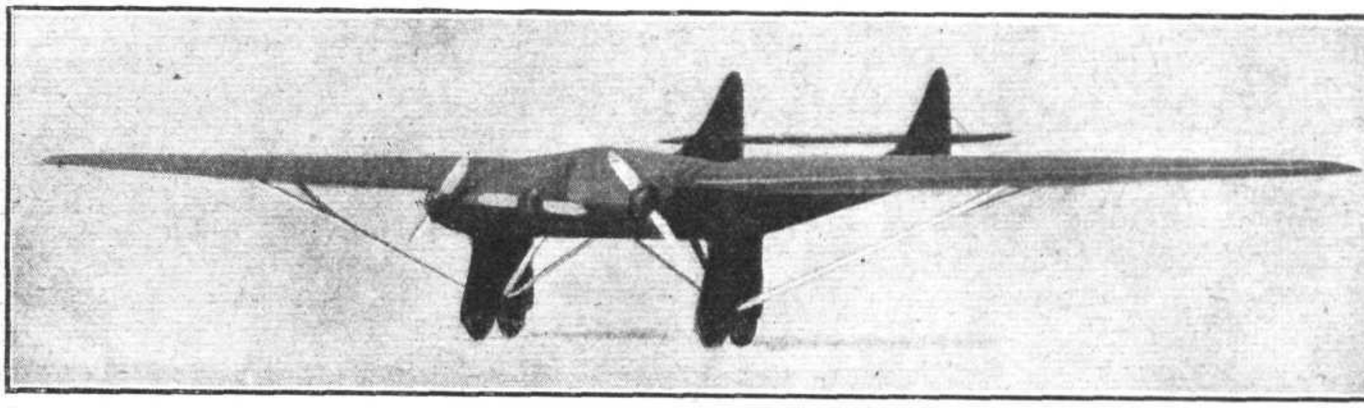
LIGHT AEROPLANES AS FLYING SCALE MODELS OF LARGE MACHINES

Good Beginning Made in France

WHILE on this side of the Channel we appear to have got into the habit of thinking of light aeroplanes as pleasure craft—intended mainly for sporting flying and, perhaps, later on for use by the private owner-pilot—there is another sphere of utility which it seems reasonable to suppose can be usefully fulfilled by the latest type of aircraft. We refer to the use of light 'planes as flying scale models of larger machines. Hitherto it has been customary, when a novel design was contemplated, to have small scale models tested in a wind tunnel, and while the usefulness of the wind tunnel is not denied—indeed, most of our present knowledge rests on the results of wind-tunnel tests—the results so obtained are not always entirely trustworthy. For one thing, there is the matter of "scale effect," or the correction to be applied to model tests in order to make them applicable to the full-size machine. Sometimes these corrections are of considerable magnitude. That in itself would be no great matter, but there is in addition a good deal of uncertainty which way the scale effect will go. Generally speaking, there is an improvement in stepping up from model to full scale—that is to say, the actual machine usually has a smaller relative resistance, and often a greater lift, than that indicated by the model tests. In some cases, however, it has been found that the scale effect "goes the wrong way," in other words, that the full-size figures are less good than the model figures. The very fact that designers know that this may be so causes a certain amount of distrust of model figures, although in the great majority of cases the scale effect is in favour of the full-size machine or component. Nevertheless, so long as any doubt on the point exists there will be a certain amount of hesitancy in accepting model figures.

Then, apart from the question of scale effect, there are a number of things which model tests in wind tunnels cannot very well give, mainly relating to controllability, etc. It is true that in the latest Duplex wind tunnels at the N.P.L., in which can be tested models complete with airscrews running at various slip ratios, the actual conditions of free flight can be very fairly imitated, but even so the conditions cannot quite compare with an actual machine flying under its own power and going through all manner of manœuvres. It would appear that it is along these lines that the light 'plane could, and should, be employed to provide at fairly low cost a flying laboratory from which much might be learned. The scale effect, even supposing that the light 'plane were but one-third the linear scale of the larger machine which it represented, would be extremely small compared with that involved in stepping up from a model measuring, for the sake of argument, 3 ft. in span, and which represented a full-size machine measuring 100 ft. in span. Controllability and other similar problems could be examined by flight on the light 'plane much better, or, at least, much more convincingly, than on the most elaborate model, and, last but not least, the cost would probably not be so very much greater. It is a fairly expensive matter to build a small but very carefully and accurately made scale model of a machine, and if such refinements as airscrews driven by electric motors are incorporated in the model, while tests are carried out on stability and controllability features as well as on the simpler lift and drag measurements, it seems likely that the total cost might very easily reach the cost of building and flying a light 'plane incorporating the main features of the larger machine.

Now that the "Million Pound Monopoly Company" is being formed, and specifications have been sent out for three-engined machines to be capable of non-stop flights from London to Malta, it might be well worth while to build light 'planes incorporating the three-engined arrangement, and conforming in geometrical shape and proportions, but on a reduced scale, to the larger machine. We admit that there are difficulties, chiefly connected with the question of power-plants, but these should not be unsurmountable. For instance, if the large machine contemplated were to be fitted with, for instance, a Napier "Lion" in the nose of the fuselage and a Siddeley "Puma" on each wing, it might not be very easy to find two types of small engines that would imitate in relative power and weight the Napier and Siddeley engines mentioned, but it should be possible to come somewhere very near to the right proportions. For instance, the Napier "Lion" might be represented by a Bristol "Cherub" and the Siddeley "Puma" by a smaller motor-cycle engine, such as the Douglas 500 c.c. The question of speed of revolution and propeller efficiency would complicate the problem, but the actual conditions could, we think, be very fairly imitated. As this use of light 'planes undoubtedly comes under the heading Research, it would seem reasonable that the Air Ministry should, in future Air Estimates, set aside certain sums to be devoted to this particular form of practical experiments. Thus, the policy followed at present, of ordering certain experimental machines so as to keep abreast of the times and having always actual practical experience of good modern types, even if financial considerations preclude the building in quantities of such types, could be extended to include a greater variety to types without greatly increasing the cost. We are, of course, aware that certain types cannot be represented by light 'plane flying models, and that the information desired can only be obtained by building the actual machine, but there are a number of other types concerning which it would appear the flying scale model could provide most valuable data, and at a small fraction of the expense of the full-size machine.



THE DE MONGE TYPE 72: This photograph shows a wind tunnel model of the machine. The engines will be Lorraine-Dietrichs of 375 h.p. each. Before building the large machine M. de Monge has had a twin-engined light monoplane built to test out the general arrangement.

A Case in Point

A very good example of the manner in which the small flying model of a large machine can be used for collecting certain data is provided by the de Monge twin-engined light monoplane, illustrated in the accompanying drawings and sketches. For the latter we are indebted to our excellent French contemporary *L'Aéronautique*. This machine represents a large three-engined commercial monoplane now under construction at the works of the French Buscaylet-de Monge firm. At the last Paris Aero Show, it may be remembered, a wind-tunnel scale model was exhibited on the stand of this firm. This model is shown in the accompanying photograph.

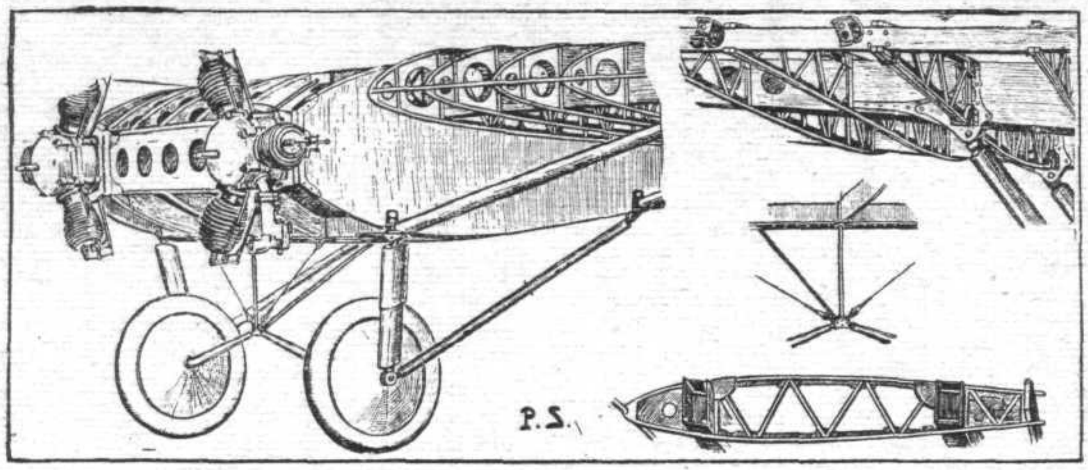
The machine, known as the de Monge type 72, is to incorporate several unorthodox features, chief of which is, perhaps, the absence of a fuselage. The centre-section of the monoplane wing is very deep and will contain the passenger cabin. The tail is carried on narrow outriggers or tail booms, as the centre-section does not extend aft as far as the tail. Now it will be seen that such a machine represents fairly radical departures from usual practice, and questions of stability, controllability, etc., naturally arise. The distribution of fin areas would appear to be quite different from the more usual, and altogether it would be difficult to say with any degree of certainty whether or not the type might be expected to be successful. The three-engined arrangement is unusual, and the question at once arises whether the machine could fly on any two engines. On a basis of load per h.p. it would be easy enough to estimate the possibility or otherwise of flying on two engines, but the problem is complicated by considerations of the turning moment set up with *one* engine stopped. A fair amount of information *could* be obtained by elaborate wind-tunnel experiments, but even so there are certain problems which can be settled much more conveniently by actual flying tests. Consequently, M. de Monge decided to build what is termed a light 'plane, although, in point of fact, it could scarcely be so described, as its total engine power is 70 h.p. Nevertheless, the machine is a fairly low-power type, and shows what could be done with even smaller engines.

The de Monge 72 will have the following characteristics: Length, o.a., 15·2 metres (49 ft. 10 ins.); span, 32 m. (105 ft.); height, 4·15 m. (13 ft. 7 ins.); wing area, 210 sq. m. (2,260 sq. ft.); engines, three Lorraine-Dietrich of 375 h.p. each; total engine power, 1,125 h.p.; useful load, 3,000 kgs. (6,600 lbs.), equivalent to 30 passengers; total loaded weight 9,000 kgs. (19,800 lbs.); power loading, 17·6 lbs./h.p.; wing loading, 9·63 lbs./sq. ft. The estimated performance is: Maximum speed, 220 kms. (136·5 m.p.h.); minimum speed, 85 kms. (52·6 m.p.h.); ceiling, 5,000 m. (16,400 ft.).

The de Monge Light Monoplane

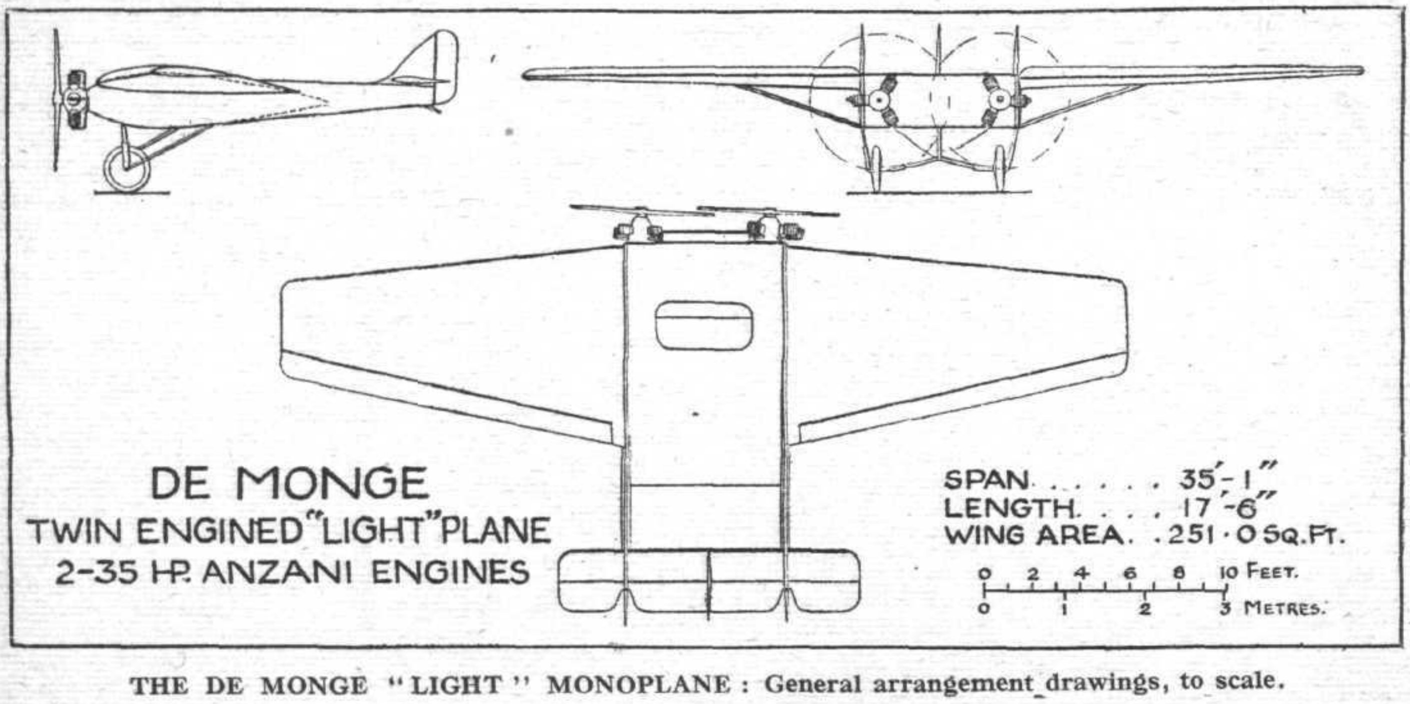
The light monoplane built to represent the larger machine is a one-third scale model of the type 72. From the general arrangement drawings it will be seen that it is not quite an exact reproduction, and that certain minor features have been changed. The general proportions, however, are reasonably closely to scale, and the main difference to be observed is in the substitution, in the smaller machine, of two engines for the three with which the large monoplane will be fitted. No doubt this change was dictated by considerations of simplicity. Otherwise there does not appear to be any reason why this feature of the design could not also have been represented in the light monoplane. As already mentioned, the light monoplane is to one-third the scale of the larger machine. Its wing area is, therefore, one-ninth of that of the type 72. As the total loaded weight of the smaller machine is 650 kgs. (1,430 lbs.), the wing loading is only 5·7 lbs./sq. ft. as compared with the 9·63 lbs./sq. ft. of the larger machine. The power loading, assuming the Anzani engines to develop 35 h.p. each, is 20·5 lbs./h.p. instead of 17·6 lbs./h.p. Thus, to estimate the performance of the type 72 from that attained by the light monoplane certain corrections will have to be applied, but these should not introduce any great uncertainty. At any rate, nowadays it is not usually very difficult to predict with fair accuracy the performance of a machine, and it is in the determination of other features, such as stability and controllability, that the main difficulty lies.

The accompanying scale drawings show the de Monge light monoplane in general arrangement, while the sketches illustrate



The De Monge "Light" Monoplane: Some constructional details. On the left, the mounting of the two Anzani engines, the undercarriage, and the root of the end section of a wing. On the right: Above, a portion of a wing, showing false spar for aileron, and wing strut attachment. Below, a typical wing rib. Inset, the hinge of the divided wheel axle.

Courtesy of "L'Aéronautique."



THE DE MONGE "LIGHT" MONOPLANE: General arrangement drawings, to scale.

some of the constructional features. The machine, like the larger type which it represents, is chiefly remarkable for the absence of a fuselage, the function of this member being performed partly by the deep centre-section of the wing, and partly by two tail booms projecting aft from the outer ends of the centre section. This centre section is of very nearly symmetrical section and fairly deep. Like the two end pieces of the wing, it is built up of two box spars, with spruce flanges and three-ply webs, and of spruce and three-ply ribs. The two end ribs of the centre section are of box section, and extend aft to form the enclosed tail outriggers. The end sections of the wing are bolted to the centre section at this point. While the centre section, or fuselage, is of uniform chord, the end sections show a pronounced taper, both in chord and thickness, and the extreme wing tips are somewhat raked. Ailerons run the whole length of the wing, right up to the tail booms, and as their chord is narrow the aspect ratio is high.

The tail consists of a fixed monoplane tail plane, to which is hinged a divided elevator, and of twin rudders. The latter are placed over the ends of the tail booms, and are thus well separated. A small fixed fin is mounted above the tail plane, midway between the two rudders.

The arrangement of the two 35 h.p. Y-type Anzani engines is unusual. In order to get the engines as close together as practicable, so as to reproduce as near as possible the conditions obtaining in the larger machine, the airscrews partly overlap one another. This has been done, not, as might be expected, by placing one engine slightly farther forward than the other, but by tilting the axes of the engines laterally. The plan view of the machine will make this point clear. How the fact that the propeller shafts are thus tilted laterally affects their running, if at all, we cannot say. As the angle is not very great, probably no ill effect results. The overlapping of the propeller discs, however, might be expected to cause a certain amount of flutter, or, at any rate, to reduce the efficiency somewhat. We understand, however, that no trouble has been experienced in this respect.

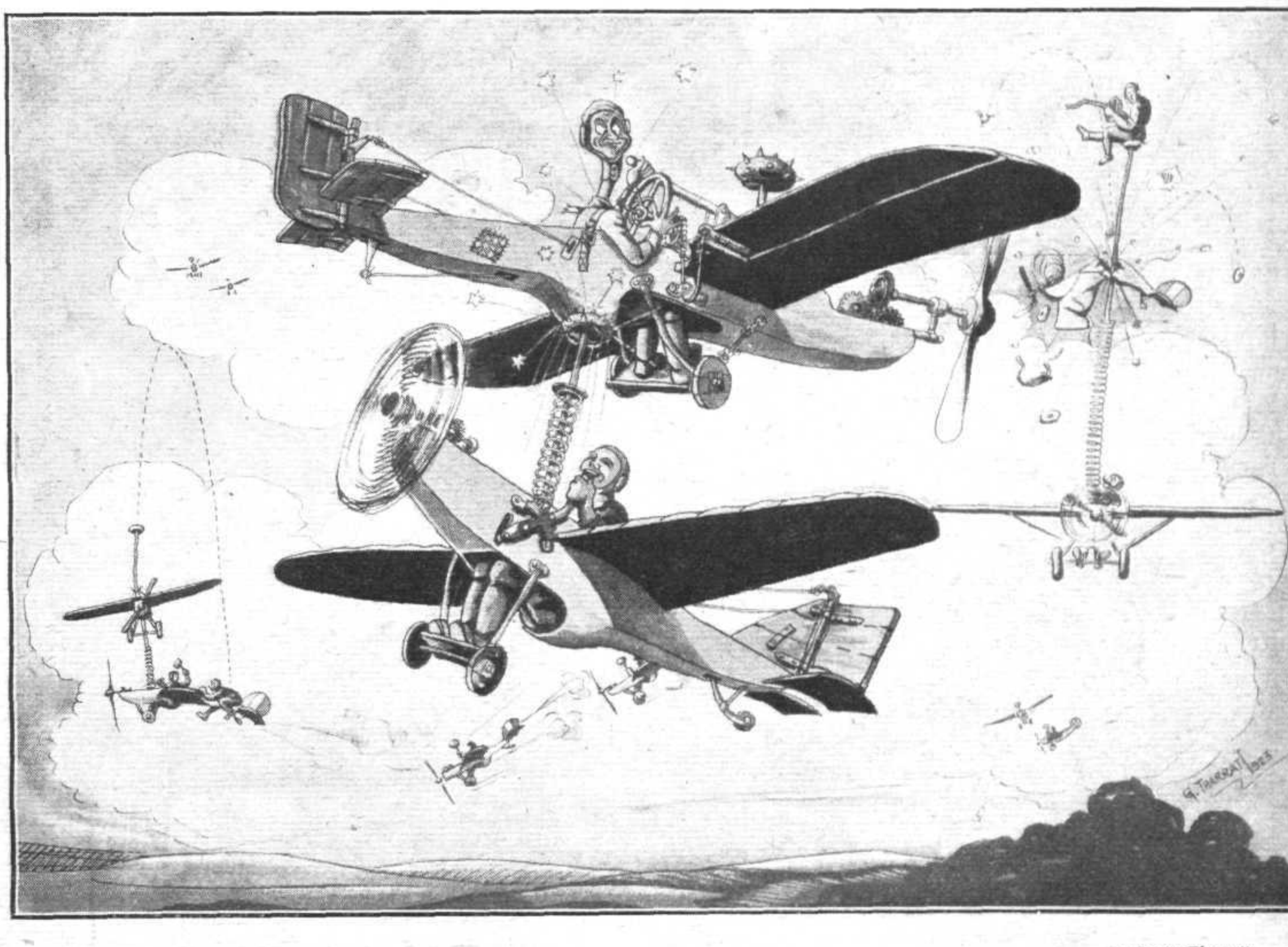
The pilot and passenger are placed in the middle of the centre section, between the wing spars, and it would seem probable that the view, especially for getting off, cannot be particularly good. For coming in to land, when the tail is well up, probably the view is not bad, although just as the tail is dropped before the machine actually touches the ground it may be expected that but little of the ground in front of the machine can be seen.

The undercarriage is of wide track, one wheel being placed under each end of the centre section or side of the fuselage. It is believed that an oleo gear is contemplated for the large machine, but in the small monoplane rubber shock-absorbers are employed. The sketch shows the undercarriage, as well as the engine plate.

The end sections of the wings are not cantilevers, but are supported by two steel tube struts attached at their inner ends to the lower corners of the fuselage, at the points where are secured the legs of the undercarriage.

The preliminary tests of the de Monge monoplane were carried out at the aerodrome at Orly by the late M. Maneyrol. It is understood that the machine proved very manœuvrable, and that Maneyrol repeatedly throttled down one engine and was able to fly on the other, the rudder controls being ample to counteract the turning moment due to eccentric thrust.

The main characteristics of the de Monge light monoplane are as follows: Length, o.a., 5·325 metres (17 ft. 6 ins.); span, 10·7 m. (35 ft. 1 in.); height, 1·65 m. (5 ft. 5 ins.); wing area, 23·33 sq. m. (251 sq. ft.); weight empty, 400 kgs. (880 lbs.); useful load, 250 kgs. (550 lbs.); total loaded weight, 650 kgs. (1,430 lbs.); wing loading, 28 kgs./sq. m. (5·7 lbs./sq. ft.); power loading, 9·2 kgs./h.p. (20·5 lbs./h.p.); power loading with one engine running, 41 lbs./h.p.; speed approximately 145 kms. (90 m.p.h.).



By George Tharratt.

"Tilting the Pilot," a new aeronautical sport.

Civilian Aviation in Czechoslovakia

by B. Trnka

A line of machines outside the hangars at the Prague civilian aerodrome.

[THE following article and illustrations were received some considerable time ago, but lack of space has prevented publication until now. The statistics given go up to the end of 1922 only, and at present the figures relating to 1923 are not available. It is hoped, however, that these may be obtained shortly, when we shall endeavour to publish them. The author of the article, Engineer Bedrich Trnka, is Director of the Kbely state aerodrome near Prague, and therefore has

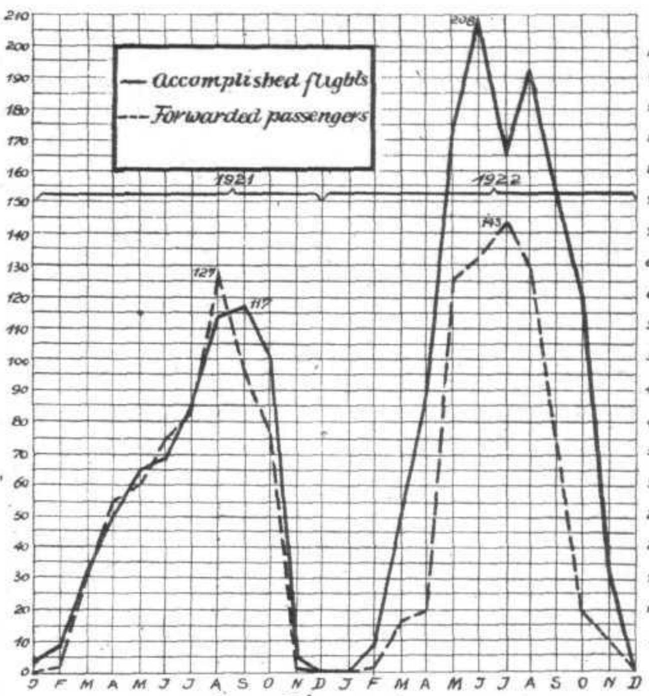
CIVIL AVIATION IN CZECHO-SLOVAKIA: The administration buildings on the civil State aerodrome at Kbely, near Prague.

CIVIL AVIATION IN CZECHO-SLOVAKIA: The single-engined Ae.10, designed and built by the "Aera" works of Prague, has succeeded in carrying no less than 17 passengers, who are shown in the inset.

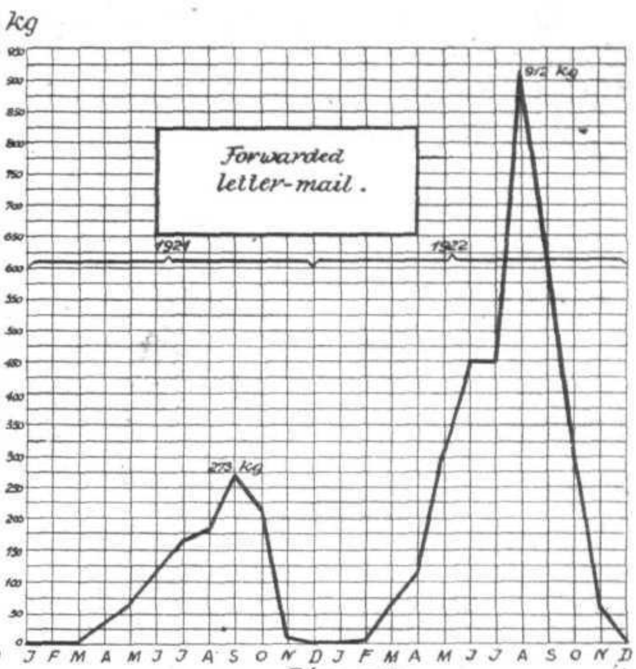
had exceptional facilities for obtaining the information upon which the statistics are based.—ED.]

At the end of the great European War no aerodrome existed in the Czecho-Slovak Republic, nor was there any industry, because the old Austria, in its anti-Czech tendencies, concentrated all aviation industries in the neighbouring German or Magyar States. At the end of the War this young Czecho-Slovak State, which had fought on all fronts on the side of the Allies, fully realised the importance of this modern arm, aviation, and began at once to build up an aircraft industry.

landing-ground is erected a radio-telegraph and a radio-telephone station, of 1 kw. force, with a range of 540 miles, and with that is also connected a radio-telephone station for wireless communication with aeroplanes. The other aerodromes mentioned are at the present exclusively used for Service aviation. The aerodrome at Prague has been a very important crossing of trans-European air-lines since 1920, on the lines Paris, Strasbourg, Prague, Vienna, Budapest, Bucharest, and Constantinople. Also Prague to Warsaw. This air-line is conducted by the Franco-Rumanian Air



Diagr. 1.

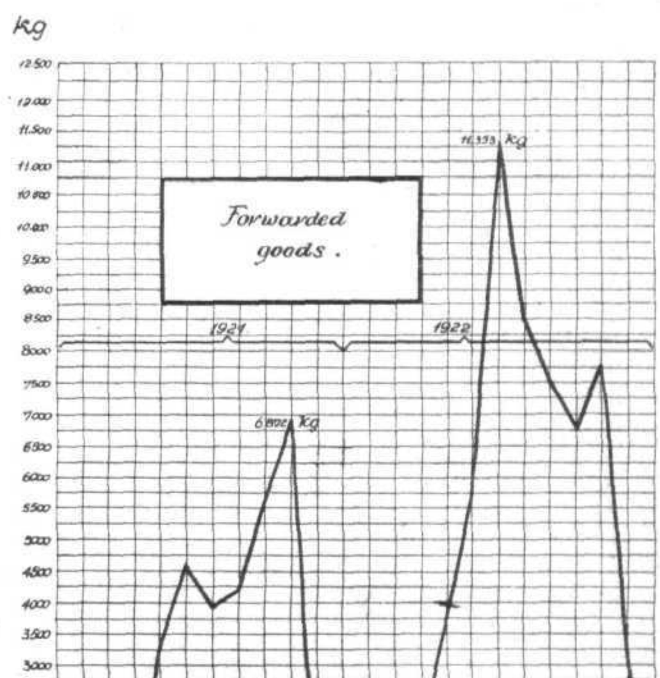


Diagr. 2.

They worked with such intensity that today, after four years of labour, they have three large aviation factories, which not only cover all the necessity of civilian and war requirements, but already begin to export to foreign countries. Types built in these factories are of original design, and have already won several home and international races. One of our illustrations shows a Czecho-Slovak aeroplane, built by the firm "Aero," with 260 h.p. motor, and developing 76 m.p.h. at a useful load of 1,670 lbs. The cabin is fitted with modern comforts for seven passengers and goods. It has provision for two pilots, with dual control, which, of course, ensures safety. The aerodynamic perfection of this aeroplane was well demonstrated when it travelled with 17 passengers, weighing 2,330 lbs., and with 440 lbs. of petrol. In the Czecho-Slovak Republic there are at the present moment aerodromes at the following places: Prague, Cheb, Olomouc Bratislava, Nitra, and Kosice. These aerodromes are provided with all necessary accommodations for aviation. For commercial aviation, however, the Kbely aerodrome, near Prague, is the most important. It is situated 4·3 miles from the centre of Prague, E.N.E., and is an ideal landing-ground of the following dimensions: 4,300 by 2,630 ft. The aerodrome is the highest point in the whole surrounding country, open to all the winds, so that it can be approached from all sides for landing. This aerodrome, just as those previously mentioned, are all State aerodromes, and the whole expense is provided by the Republic.

The photograph at the head of this article shows a view of four hangars, which house the commercial aeroplanes. Three of these are of iron and concrete construction, fully fireproof, 98 by 110 ft., and the height of the door is 19·5 ft. The fourth hangar is of iron construction, also fireproof, 98 by 125 ft., and the iron doors are 26·2 ft. high. All the hangars are electrically lighted, and they will be in the near future centrally heated. Each hangar is provided with two water reservoirs for collecting rain-water, forming, as it were, a reserve for use in case of fire. The same water is used for the engine radiators. Near each hangar are two small repair shops. Besides these hangars at the aerodrome at Prague there are all buildings connected with administration and the direction of the aerodrome, postal and custom house, offices of the societies, restaurant, garages for automobiles, repair shops, and storerooms for petrol.

Another photograph shows the group of three small administration buildings. At a distance of 980 ft. from the



Diagr. 3.

Transport Company, with central offices at Paris. The progress of this line is indicated in Diagrams 1-3. Diagram 1 gives the total of flights and passengers carried in each month, 1921 and 1922. Diagram 2 shows the development of the air mail, and Diagram 3 of the carriage of newspapers and goods.

The curves on these diagrams show the upward tendency. It is perhaps necessary to add that the aerial transport is carried out only for eight months in each year, because during November, December, January, and February the unfavourable meteorological conditions do not allow aerial transport to Prague.

It is possible to say that the situation of the Czecho-Slovak Republic, with its central aerodrome at Prague, will one of these days make it the centre of the international European air services operating aeroplanes to the north, south, east, and west, as was already pointed out two years ago in FLIGHT. The consolidation of financial and economic conditions of the Czecho-Slovak Republic will bring about the realisation of this ambition, helped forward by the energetic and enthusiastic labours of those connected with aviation.

In conclusion, it may be interesting to give the total results achieved on this line for two years :—

	Miles.	No. of Passengers.	Post, in lbs.	Newspapers and Goods, in lbs.	Passengers Injured.
1921..	182,432	608	2,376	66,780	0
1922..	340,000	672	6,936	124,651	1

French Altitude Record

FLYING a Schreck F.B.A. flying boat, M. Laporte has established a new record for seaplanes by reaching an altitude of 5,535 metres (18,300 ft.). This is the corrected figure officially issued by the *Laboratoire des Arts et Métiers*. The actual reading of the barograph was 5,800 metres (19,000 ft.). The previous record for seaplanes was held by the American pilot Harper with a height of 14,000 ft.

Silly questions we have been asked :

POST OFFICE OFFICIAL : "Can't you move your machine, sir ? It's hopeless trying to get messages through ! "

LIGHT 'PLANE AND GLIDER NOTES

The Parnall "Pixie" light monoplane which, fitted with small wings, won the Abdulla speed prize at Lympne, is fully described in a booklet just received from the makers, Messrs. George Parnall and Co., of Coliseum Works, Park Row, Bristol. The "Pixie," it will be remembered, had interchangeable engines and two pairs of wings. With the 500 c.c. Douglas and the large pair of wings the machine had a reasonably good top speed and a very low landing speed. For the Abdulla prize she was fitted with a 750 c.c. Douglas and a small pair of wings, and developed an average speed over the Lympne course of 76·1 m.p.h. One lap of the course was actually made at a speed of 82 m.p.h. in a wind of something like 35 m.p.h.

* * *

The booklet referred to deals in considerable detail with the construction of the "Pixie," but it seems rather regrettable that more illustrations of constructional details and other features, of which the "Pixie" has quite a few, were not included in an otherwise very attractive descriptive booklet.

* * *

We quote the following remarks as showing the views of the makers on the utility of the light 'plane: "The light single-seater is useful to the sportsman with some previous flying experience, or to the Service pilot as a training machine. The former, flying only occasionally, wants a machine with a low landing speed, and yet possessing a reasonably good speed range. In addition, the wings must be capable of rapid and easy detachment in order that the aircraft may be housed within a limited space. In the 'Pixie,' with large surface wings, we have a machine which can land at just over 30 m.p.h. and possessing a top speed of approximately 90 m.p.h., with a ceiling of approximately 18,000 ft. The wings can be rapidly detached for transportation or housing.

* * *

"To the experienced pilot, however, accustomed to landing at higher speeds, such an alighting speed is unnecessarily low, and the 45 m.p.h. landing speed of the small-wing 'Pixie' would present no difficulties. The top speed of 105 m.p.h., however, would be quite useful, and as a cheap training machine for scout pilots the type is of great value. In the first place, a number of these aircraft can be purchased for the price of one expensive scout. Moreover, the control is very light, the machine is extremely manœuvrable, and can be stunted with facility."

* * *

As the machine was described and illustrated in Flight on October 25, 1923, there is no need to go into details here. Suffice it to point out that, apparently, it is the intention of the constructors to fit larger engines in the next type. Thus in the booklet it is stated that the Bristol "Cherub" 1,070 c.c. flat twin and the Blackburne 698 and 1,000 c.c. V twins can be readily fitted. The former engine has already been described in Flight, as has also the smaller Blackburne, which was the engine that became so popular at the Lympne competitions. The 1,000 c.c. Blackburne is a new type, and will, we understand, be produced in time for next year's competitions for two-seaters. This engine will be a three-cylinder radial, with cylinders similar to those of the present 698 c.c. Blackburne engine.

Basing the estimate on the assumption that the 1,000 c.c. Blackburne is fitted, the following performance figures have been obtained and are found in the booklet: With large wings—landing speed, 33 m.p.h.; top speed, 90 m.p.h.; ceiling, 18,000 ft. With small wings—landing speed, 45 m.p.h.; top speed, 105 m.p.h.; ceiling, 14,500 ft. The machines will of course, be produced under official A.I.D. inspection and of the best aircraft materials. There should be a market for machines of this type not only at home in connection with the R.A.F., but perhaps even more so abroad, where distances are great, and where, consequently, compared with existing means of travel, flying at something like 60 or 70 m.p.h. would be considered quite a high speed. The small-wing machine should particularly appeal to foreign governments as a means for enabling pilots to obtain a lot of flying practice at relatively trifling cost. The "Pixie" booklet can be obtained from the manufacturers by application in writing to above address.

* * *

A correspondent suggests that it would be a pity to get the Selfridge prize of £1,000 transferred to the light 'plane class, and expresses the hope that it will be retained for gliders, at any rate during 1924. There is something to be said for this, although gliding appears to have lost its interest in this country. With the exception of Mr. Gray of Berwick-on-Tweed—who, by the way, will probably not have his biplane glider ready in time to make the attempt this year, there does not appear to be anyone who has seriously contemplated an attack on the Selfridge prize. In Germany the interest in gliders is still as keen as ever, but the manner in which the subject has been tackled over there is rather different. While the British competition at Itford was of a purely sporting character, the German tests in the Rhön hills were much more in the nature of scientific experiments, and were approached in that spirit. It seems doubtful if gliding will be taken up in that spirit in this country, and that being so we still think that more good might be done by devoting the Selfridge prize, always assuming that Mr. Selfridge would agree to having his very generous offer transferred, to some outstanding light 'plane performance in 1924. We shall be glad to have other views on this subject.

* * *

With reference to the de Monge monoplane described in this week's issue of Flight, and which, for want of a better term, we have called a light 'plane, although its 70 h.p. rather places it outside that category, is now being tested by the well-known French pilot Descamps of glider fame. The original tests were made by the late M. Maneyrol, and Descamps has now taken over the task of completing the tests. On Wednesday, December 12, he flew the machine from the aerodrome at Orly to Villacoublay. The distance is but short, it is true, and occupied only a few minutes, but at any rate the flight may be termed a cross-country one. The machine behaved well, and no trouble was experienced from the somewhat unusual general arrangement. It is stated that the French *Service Technique* is following the tests with interest, and look upon the machine as representing, on a reduced scale, the commercial machine of the future.

"R. 38" MEMORIAL PRIZE

The Council of the Royal Aeronautical Society announce their award in connection with the papers submitted for the "R.38" Memorial Prize, 1923. In view of the high standard of the essays sent in, they have decided to increase the amount for this year only from 25 guineas to 40 guineas, and to divide the prize between the papers on "The Aerodynamical Characteristics of the Airship as Deduced from Experiments on Models, with Application to Motion in a Horizontal Plane," by Mr. R. Jones, M.A., and "A Detailed Consideration of the Effect of Meteorological Conditions on Airships," by Lieut.-Col. V. C. Richmond, O.B.E., A.F.R.Ae.S., and Major G. H. Scott, C.B.E., A.F.C.

Both these papers will be published in the *Journal* of the Royal Aeronautical Society, together with the paper on "The Strength of Rigid Airships," by Mr. C. P. Burgess, Commander J. C. Hunsaker, U.S.N., Hon. F.R.Ae.S., and Mr. Starr Truscott, which the Council mention as deserving special commendation.

Intending competitors are reminded that the names of entrants for the 1924 prize should be sent in to the Secretary, Royal Aeronautical Society, 7, Albemarle Street, London, W. 1, on or before the 31st instant. The last date for the receipt of the papers is March 31, 1924.

It will be remembered that the "R.38" Memorial Prize was instituted by the Council of the Royal Aeronautical Society in 1922, from a fund raised under the auspices of the Society in memory of the American and British lives lost in the disaster to the airship "R.38" (Z.R.2) on August 24, 1921.

The Royal Aero Club: Christmas Holidays

On Christmas Day and Boxing Day, December 25 and 26, 1923, luncheons, dinner and teas will not be served in the Club, and the bar will be closed. Breakfasts only will be served to members staying in the Club.

Martlesham Heath Dinner

The annual Martlesham Heath dinner will be held at the R.A.F. Club, at 7.30 p.m., on February 1, 1924. Tickets, 15*s*., exclusive of wines, obtainable from P.M.C., Martlesham Heath, up to January 14, 1924.

MODEL SUPPORTS AND THEIR EFFECT ON THE RESULTS OF WIND TUNNEL TESTS*

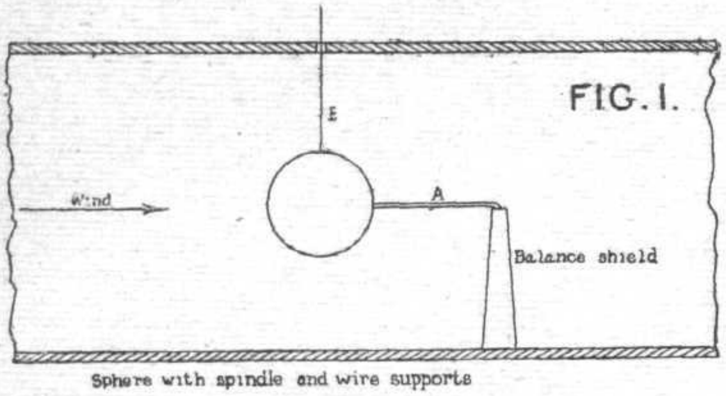
BY DAVID L. BACON

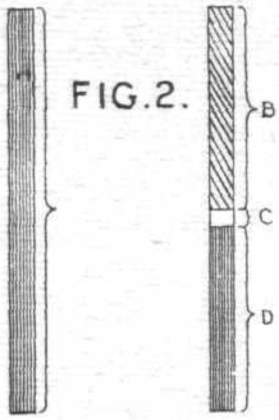
THE part of a balance supporting a model in the air stream of a wind tunnel experiences a force which must be deducted from the total force measurement in order to find the force on the model alone. This correction is known as "spindle drag" or "wire drag," and its exact value can easily be measured on the balance if the model is disconnected from the spindle and supported in close proximity thereto by some auxiliary means.

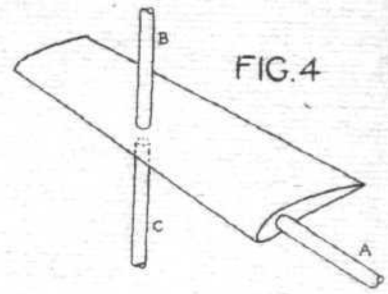
More important than the actual drag of the spindle itself, is the disturbing effect which the presence of the support exerts on the airflow about the model. This is termed "spindle interference" or "wire interference." Spindle interference depends primarily on the position of the spindle with respect to the model. As an extreme example of interference we may take the case illustrated in Figs. 1 and 2, of a sphere supported in a wind tunnel by a bent spindle, A, and by a fine wire, B. The measured drag of the sphere, spindle, and wire is 0·372 kg., and that of the wire alone 0·014 kg., but if we remove the wire and repeat the measurement on sphere and spindle we find the drag to be not 0·358 kg. but 0·169 kg. Thus we see that while the wire drag amounted to only 4 per cent., its interference is of the order of 50 per cent., of the gross measurement.

Similarly we could retain the wire, and, by removing the spindle, get values for spindle drag and spindle interference. Unfortunately the sum of the spindle and wire interferences thus measured, one at a time, is not rigorously equal to the combined interference of the spindle and of the wire acting simultaneously. Thus it is impractical to eliminate entirely the support interference in wind tunnel research, because the interferences of two supports on the same model may be mutually interdependent. In the testing of airfoils and of model airplanes, the elongated shape of the model permits such separation of the main and auxiliary supports that the secondary interferences of the supports may probably be made negligibly small.

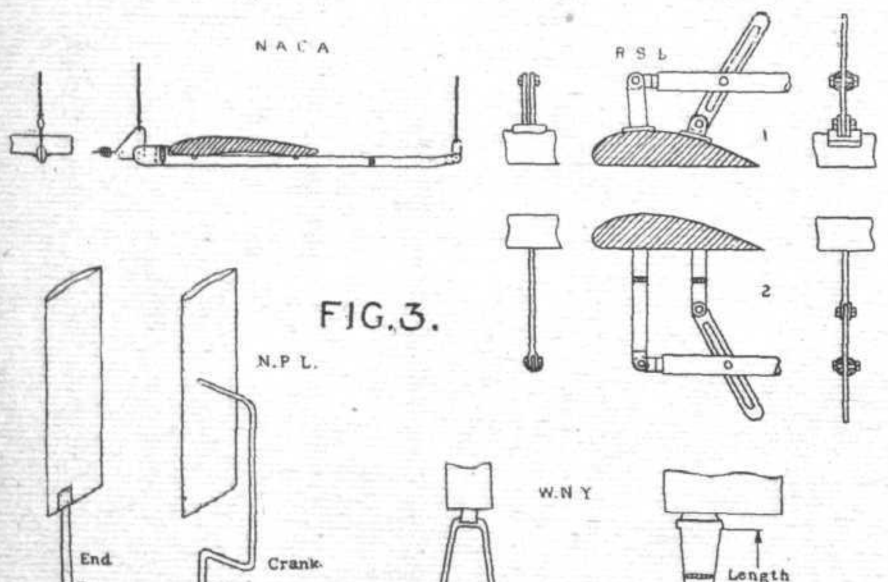
Limiting ourselves to a discussion of airfoil testing, we find that there are now in use in this country four different types of airfoil supports, and fully as many more abroad (*see* Fig. 3).

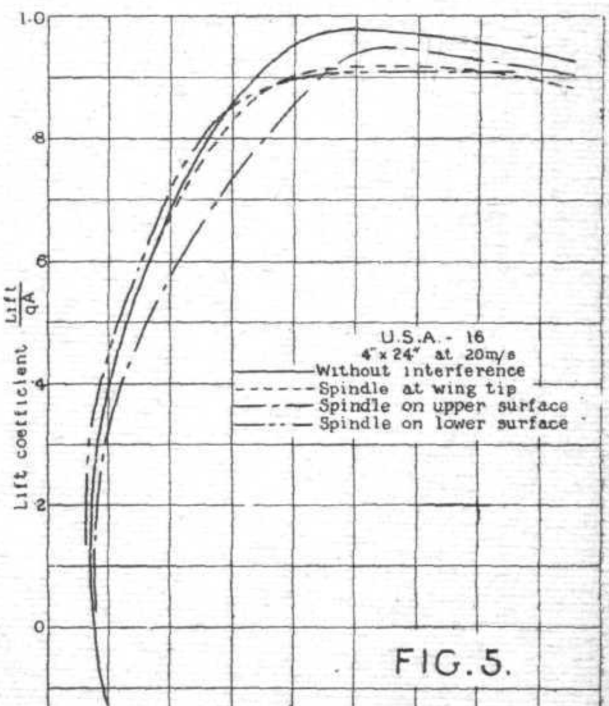






MODEL SUPPORTS: Fig. 1.—Sphere with spindle and wire supports. Fig. 2.—Resistance measurements on a sphere mounted as in Fig 1. Left, drag of model spindle and wire tested as a unit = 100 per cent. B, interference of wire on model = 50 per cent. C, drag of wire alone = 4 per cent. D, drag of model and spindle tested without wire = 46 per cent. Fig. 4.—Positions of dummy spindle.





MODEL SUPPORTS: Fig. 3.—Various types of aerofoil supports. Fig. 5.—Lift and drag coefficients with interferences.

* *Technical Note No.* 130.—National Advisory Committee for Aeronautics.

We also note that some laboratories correct their tests for support interference, while others neglect it entirely. Even among those who introduce interference corrections, there is no uniformity of practice as to the method of obtaining the correction.

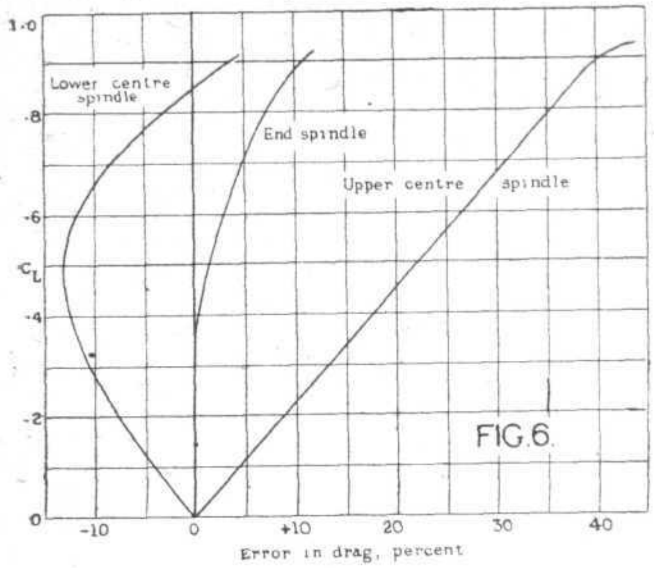
In the following tests a 4-in. by 24-in. U.S.A. 16 airfoil was supported on the skids of the N.A.C.A. wire balance, and the tunnel operated at a speed of 20 metres per second (65·6 ft. per sec.); then, with all other conditions remaining strictly constant, a dummy spindle 9·5 mm. (3/8 in.) in diameter was brought into close proximity to the model, first at a wing tip and then successively to the upper and lower surfaces at the mid points of the span, shown in Fig. 4 as positions A, B, and C respectively. The lift and drag coefficients computed from these tests are given in Table 1, and are plotted as polar curves in Fig. 5.

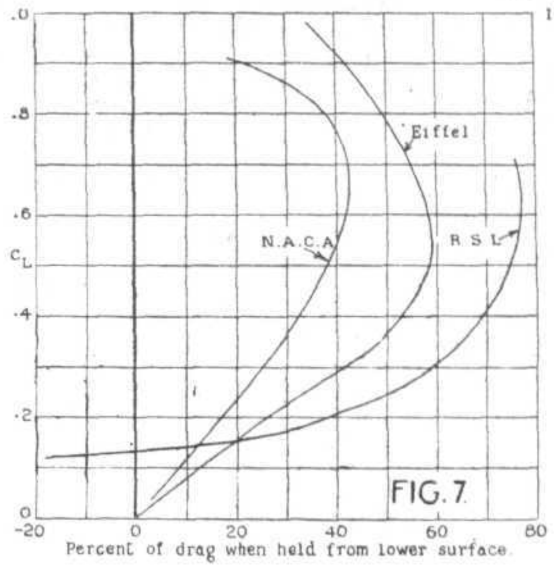
If we neglect the disturbing effect of the spindle on the wires, and of the wires on the spindle interference, we may plot curves of drag interference for the three spindle locations, as shown in Fig. 6.

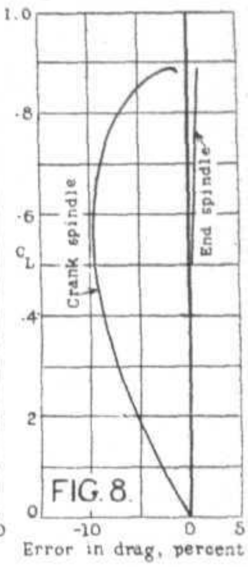
The end spindle has little effect at low lift coefficients, but by reducing the maximum lift it introduces an appreciable correction when the angle of attack is increased. At lift coefficients less than 0·3 the two centre spindles have opposite and nearly equal effects, the one on the lower surface decreasing the drag, and that on the upper surface increasing it. At higher lift coefficients the interference of spindle B, on the upper surface increases uniformly until it adds 40 per cent. to the drag of the airfoil. The interference of spindle C, on the lower surface, reaches a maximum negative value of 13 per cent. at a lift coefficient of 0·5 and then decreases to zero, becoming positive for lift coefficients above 0·85.

An attempt was made to get some information on the interference of the skids used with the wire balance. This was done in the following manner. Using an N.P.L. type of balance and a wing-tip spindle, three drag measurements were made: (*a*) of a wing alone, (*b*) of a wing with two skids attached to the lower surface, and (*c*) of a single skid fastened directly to the balance spindle. The drag of (*a*) was found equal to that of (*b*) − 2 (*c*) within the error of measurement of the balance.

Although other investigators have called attention to the existence of support corrections, the large error which may be caused by neglecting them is not generally appreciated in engineering circles. It is therefore to be hoped that the above tests, together with those quoted in the Appendix, will serve to show the danger of attempting to compare or apply airfoil coefficients, regardless of origin, unless adequte interference corrections are known to have been applied.







MODEL SUPPORTS: Fig. 6.—Interference of dummy spindles on U.S.A. 16. Fig. 7.—Interference of spindle on upper surface if spindle on lower surface gives true drag. Fig. 8.—Spindle tests from University of Toronto.

Appendix

A communication from the Eiffel Laboratory calls attention to the interference caused by the supports until recently used in that wind tunnel. The report states that the drag coefficients previously issued from that laboratory were uniformly high because of the airfoils having been supported on brackets attached to the upper surface, and that by supporting the airfoil from the lower surface, spindle interference can be avoided. Eiffel then explains that the interference affects only the induced drag and not the profile drag, hence its effect can be treated in a manner similar to that used for aspect ratio, and an example is given to demonstrate that, within certain limiting values of λ, the drag of a wing of aspect ratio λ held by a certain fixture screwed to the upper surface is equal to that of one of the same area and profile having an aspect ratio $\lambda - 2$ held by that bracket on the lower surface. The magnitude of this correction is shown in Fig. 7.

No proof is offered to show that the support on the lower surface does not cause interference, and it seems doubtful that this should actually be the case. In fact, it is probable that at low angles of attack the true drag lies intermediate between these two conditions, and that a more accurate drag coefficient would be obtained by correcting to an effective aspect ratio of $\lambda - 1$ the Eiffel tests of airfoils held from the upper surface, and to $\lambda + 1$ those in which the airfoils were held from the lower surface.

There are also available data from Amsterdam giving the drag of an airfoil when held by two types of centre support. For the sake of comparison we have plotted in Fig. 7 the drag when held by spindles on the upper surface in per cent. of that when held from the lower surface. These R.S.L. curves show a decided interference effect on the profile drag at low

Table 1.

Interference on U.S.A. 16.

	None			End Spindle			Spindle Above			Spindle Below			Wire Screen		
a	C_L	C_D	L/D	C_L	C_D	L/D	C_L	C_D	L/D	C_L	C_D	L/D	C_L	C_D	L/D
−2°	−·058	·0159	−3·7	—	—	—	—	—	—	—	—	—	0·032	·0164	1·9
0°	·117	·0141	8·2	·149	·0137	10·9	·130	·0151	8·6	·130	·0132	9·8	0·185	·0164	11·1
2°	·324	·0166	19·5	·344	·0168	20·5	·330	·0197	17·0	·344	·0146	23·5	0·324	·0206	15·0
4°	·474	·0240	19·7	·480	·0243	19·8	·480	·0301	15·9	·486	·0213	22·9	0·454	·0284	16·0
6°	·610	·0342	17·8	·615	·0364	16·7	·603	·0430	13·9	·635	·0304	21·0	0·590	·0394	15·0
8°	·745	·0458	16·2	·778	·0540	14·4	·740	·0610	12·1	·745	·0433	17·3	0·726	·0550	13·2
10°	·860	·0615	14·1	·895	·0680	13·2	·850	·0810	10·6	·870	·0635	13·7	0·843	·0720	11·7
12°	·960	·0810	12·0	·920	·1090	8·5	·960	·1030	9·4	·910	·1100	8·3	0·955	·0915	10·4
14°	·950	·1450	6·6	·910	·1920	4·8	·920	·1930	4·8	·910	·1390	6·5	1·040	·1210	8·6
16°	·890	·2330	3·8	·870	·2470	3·5	·895	·2430	3·7	·890	·2280	3·9	1·060	·1670	6·3
18°	·870	·2640	3·3	·843	·2800	3·0	·875	·2660	3·2	·840	·2600	3·2	1·070	·2260	4·7
20°	·800	·2860	2·8	—	—	—	—	—	—	—	—	—	1·000	·2860	3·5

lift coefficients, due probably to the thickness of the airfoils used for the test.

The University of Toronto has made an investigation of the interferences of end and crank spindles from which we have derived the curves of Fig. 8. The end spindle interference is so low as to be almost negligible, the values being approximately one-quarter of those obtained in the N.A.C.A. test. This may be partially explained by the ratio of spindle diameter to airfoil chord, 0·0936 for our tests and 0·0625 for University of Toronto, though this 50 per cent. increase in relative diameter is probably not the sole cause for disagreement. The curve for the crank spindle bears a strong resemblance to our curve for a support at the centre of the lower surface. In this connection it should be noted that, while most of the crank spindle is of circular section, it is possible to make that portion which is perpendicular to the span of the model of streamline section.

The support used in the 8-ft. tunnel at the Washington Navy Yard is so carefully streamlined that, although it is attached to the upper side of the wing, its interference has been found to be so small that it may be neglected.

At the Göttingen Laboratory no corrections for wire interference were being applied in 1921, though a special research to determine this correction was then under consideration.

CIVIL AVIATION IN SWEDEN

AT two recent meetings of the Swedish Aero Club the question of air traffic in Sweden was discussed, and three schemes submitted were examined. One of these, submitted by Capt. Lenn Jacobson, to the effect that civil air traffic would be organised and operated by the Swedish Naval and Military Air Services, was rejected on the grounds of being too costly and impracticable. The second scheme, also submitted by Capt. Jacobson, was an offer by the Fokker Company to operate a service between Rotterdam and Malmö. This, also, was looked upon with disfavour, and it was stated that Sweden should develop her own air traffic and not rely on outside organisations.

The third scheme was submitted by the brothers Florman, and received favourable comment. As a result a new Swedish air traffic company, the "Aerotransport Aktiebolag," has been formed by Capt. Carl Florman, Lieut. Adrian Florman, and Hr. Tage Cervin, banker. The minimum capital is 25,000 kroner. The company has approached the Swedish Aviation Department with proposals for operating an air service between Malmö and Hamburg. Two alternative schemes are submitted, but in both the aircraft to be used for operating the service are De Havilland 50's.

The first scheme suggests that the Flormans should themselves organise and operate the line, employing pilots and mechanics selected from the best in Sweden and England, or employing only Englishmen. In these conditions, it is reckoned that the operational costs, including pilots' and mechanics' salaries, would amount to 1·07 kroner per kilometre. The cost, exclusive of organisation and management, would be 1 kroner per kilometre.

The second scheme suggests that the pilots and mechanics should be at the disposal of the Swedish Government and should be paid by the said Government. The D.H.50 aircraft would be bought by the Government at a cost of £2,300 per aeroplane, or £2,250 each if five were purchased, or £2,150 each if 10 were purchased. The expense of organisation and management would be 0·07 kroner per kilometre.

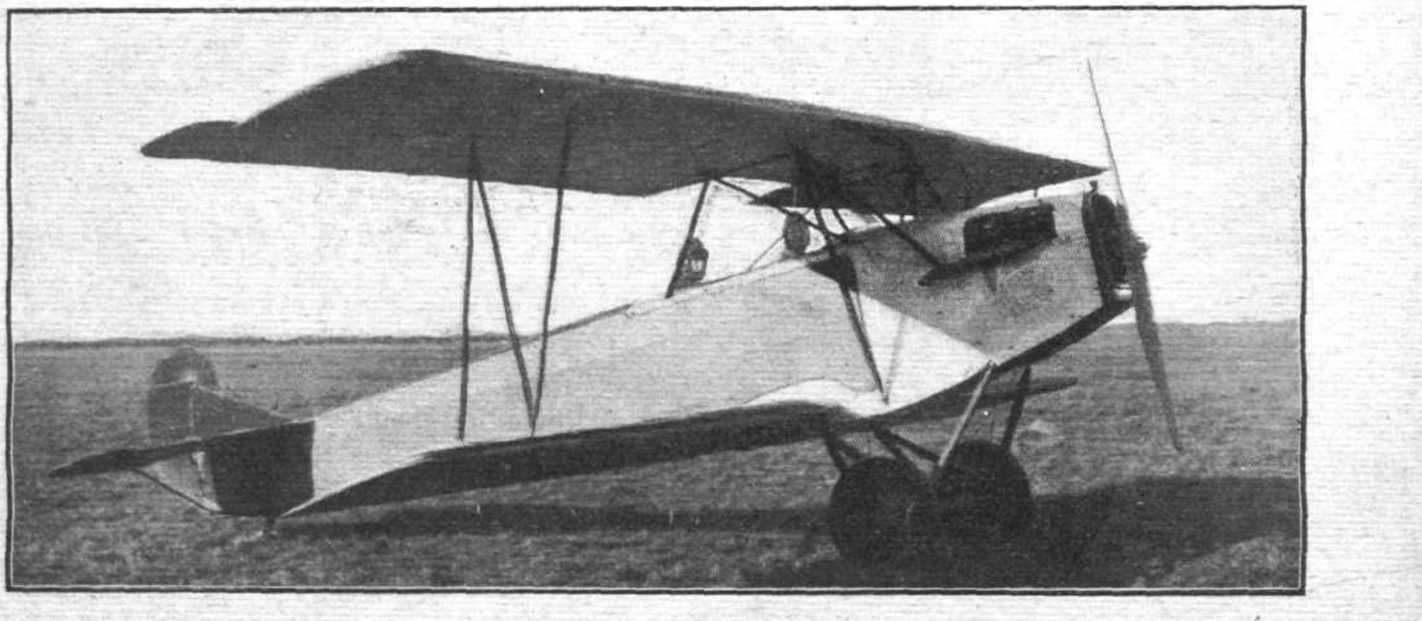
The proposal submitted states that the D.H.50 is the best traffic aeroplane obtainable, and refers to the performance put up during the Gothenburg-Copenhagen-Gothenburg traffic competition.

The offer is open to acceptance until April 1, 1924. The Florman firm are willing to sign a three years' contract, and, if it is considered desirable, to employ Swedish pilots exclusively for the first scheme.

According to the calculations submitted in the above scheme, the total cost of the double flight Malmö-Hamburg would be between 660 and a little over 700 kroner the latter if the whole organisation is undertaken by the Florman firm. It is of interest to compare this with the cost estimated recently for the same service by Capt. Lenn Jacobson, whose estimate amounted to 1,200 kroner.

Lawrence Sperry Missing

UP to the time of writing there is no news as to the fate of Lawrence Sperry, the American pilot who was paying a visit (with his small 'plane) to this country, and who on December 13 started on a flight to Amsterdam. A certain amount of mystery surrounds this regrettable incident, as may be gathered from the following facts. He was last seen passing over the coast near Fairlight (3 miles from Hastings), witnesses stating that he was flying low and that his engine was running erractically. He circled round once or twice over land and then flew out to sea, disappearing into the mist. It was reported shortly after that he was seen to fall into the water, some 3 or 4 miles out. A boat put out from Rye, and eventually found the machine floating on the water, practically undamaged, but no trace of the pilot could be found. The machine was brought ashore, and has been sent to Lympne to be examined.



THE FOKKER S.III: Fitted with a 90 h.p. Curtiss engine, this machine is intended for school work. It is of usual Fokker construction, with steel tube welded fuselage and all-wood wings. The "Fokker Bulletin" states that recently Mijnheer Fokker took up as passenger in this machine General Festing, and gave a demonstration of stalling at low heights. It will be remembered that it is claimed for the Fokker machines that they remain controllable at angles far above the stalling angle.

THE ROYAL AIR FORCE

London Gazette, December 11, 1923

General Duties Branch

Squadron Leader W. Sowrey, D.F.C., A.F.C., is granted a permanent commn. as a Flight Lieut.; Oct. 9. His name will be placed on gradation list of Flight Lieuts. immediately below that of Flight Lieut. J. E. B. B. MacLean, D.S.C. Flying Officer H. R. McL. Reid is granted permanent commn. in rank stated; Dec. 12. H. W. Allen is granted a short service commn. as Flying Officer, with effect from, and with seny. of, Dec. 3. The following Pilot Officers are promoted to rank of Flying Officer, with effect from Dec. 1 and with seny. of Dec. 9, 1922:—F. C. Marsh, E. L. W. H. Alms.

Flying Officer G. J. Rayner relinquishes his short service commn. on account of ill-health; Dec. 12.

Medical Branch

Flight Lieut. (Hon. Squadron Leader) J. N. MacDonald is granted acting rank of Squadron Leader whilst so employed; April 25, 1922; Flight Lieut. J. W. Harper, M.D., is transferred to the Reserve, Class D.2; Dec. 14.

Reserve of Air Force Officers

The following are granted commns. in General Duties Branch as Flying Officers on probation (Dec. 11):—*Class A*.—C. K. Robinson. *Class B*.—L. D. G. Morrison, J. S. C. Robinson.

Pilot Officer J. C. Montgomery is transferred from Class A to Class B; Oct. 13.

The following Officers are confirmed in rank, with effect from dates indicated.—*Flying Officers*.—A. W. Day; Nov. 18. H. G. W. Debenham, J. W. Grose, H. A. Love, R. K. Rose, J. T. Rymer, H. Sanders, H. A. Yeo; Nov. 22. L. P. Coombes, D.F.C., G. F. Court, L. A. Wingfield, M.C., D.F.C.; Nov. 29. *Pilot Officers*.—L. F. Headley, A. Wren; Nov. 15. G. E. Muir; Nov. 18. E. D. Ayre, R. W. Barton, W. McL. Hirons, W. F. A. Snell; Nov. 22.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Flight Lieutenant J. A. MacNab, to Sch. of Naval Co-operation, Lee-on-Solent. 10.12.23.

Flying Officers: P. H. Burt, to R.A.F. Depot on transfer to Home Estab. 10.12.23. M. M. Freehill, D.F.C., to No. 25 Sqdn., Hawkinge. 5.12.23. C. H. V. Hayman, to H.Q., Iraq. 9.11.23. D. C. Prance, to R.A.F. Depot, on transfer to Home Estab. 1.12.23. F. Woolley, D.F.C., to R.A.F. Depot (Non-effective Pool). 1.12.23. C. E. Bowden, to R.A.F. Depot (Non-effective Pool). 13.10.23. L. F. Pendred, D.F.C., to R.A.F. Cadet College, Cranwell, on transfer to Home Estab. 22.12.23.

Pilot Officers: W. H. Phillips, to R.A.F. Base, Calshot. 17.12.23. E. Reid, to No. 2 Flying Training Sch., Duxford. 17.12.23. D. S. Brookes, to Sch. of Army Co-operation, Old Sarum. 17.12.23.

Accountants' Branch

Pilot Officers: C. G. Bull, to No. 1 Sch. of Tech. Training (Boys), Halton. 11.12.23. C. W. Cackett, to R.A.F. Depot. 11.12.23. J. Charles, to No. 5, Flying Training Sch., Shotwick. 11.12.23. E. F. Colman, to No. 32 Sqdn., Kenley. 11.12.23. W. R. Donkin, to Central Flying Sch., Upavon. 11.12.23. C. P. Puckridge, to Electrical and Wireless Sch., Flowerdown. 11.12.23. C. B. Rawlins, to No. 3 Stores Depot, Milton. 11.12.23. F. C. Warner, to No. 1 Flying Training Sch., Netheravon. 11.12.23.

Medical Branch

Squadron Leader R. J. Aherne, M.C., to R.A.F. Depot, on transfer to Home Estab. 1.1.24. R. J. Aherne, M.C., to R.A.F. Hospital, Cranwell. 22.2.24.

Flight Lieutenants: W. Parsons, to Research Lab. and Medical Officers' Sch. of Instruction, Hampstead, on appointment to a Short Service Commn. for course of instruction. 3.12.23. W. F. Wilson, M.C., M.B., to R.A.F. Central Hospital, Finchley. 7.1.24. R. S. Topham, M.B., D.P.H., to H.Q., Coastal Area. 9.1.24. B. C. W. Pasco, to No. 5 Flying Training Sch., Shotwick. 14.1.24. B. F. Beatson, D.T.M., to No. 2 Flying Training Sch., Duxford. 8.1.24. C. A. Moaden, to Sch. of Tech. Training (Men), Manston. 10.1.24. A. F. Rook, M.R.C.P., D.P.H., to R.A.F. Hospital, Cranwell. 1.1.24.

Flying Officers: J. M. Rourke, M.B., to Aeroplane Experimental Estab., Martlesham Heath. 12.12.23. F. W. G. Smith, M.B., B.A., to R.A.F. Depot. 4.1.24. R. W. White, to R.A.F. Central Hospital, Finchley. 1.1.24.

BRITISH STANDARD LIST OF TERMS AND DEFINITIONS USED IN RADIO COMMUNICATION

(B.E.S.A. Publication No. 166—1923.)

This List forms one Section of a "Vocabulary of Terms and Definitions used in Electrical Engineering" which is in active preparation by the British Engineering Standards Association, and which will be issued shortly. The present list of radio terms and definitions contains definitions of about 170 terms in general use, but owing to the rapid growth of the subject it is not possible to include every term used in connection with radio science, and such new terms as survive will be incorporated in future revisions of the list. Where the same definition applies to more than one term, the term recommended for general use is printed in bold type, the other terms being given in lighter type as synonyms of the preferred term. In this way the Committee responsible for drawing up the list hope to encourage uniformity in the matter of nomenclature, a step which is specially desirable in the case of such a rapidly developing science as radio communication.

Copies of this publication are obtainable from the B.E.S.A. Publications Department, 28, Victoria Street, London, S.W. 1, price 1*s*. 2*d*., post free.

CORRESPONDENCE

SELFRIDGE GLIDING PRIZE

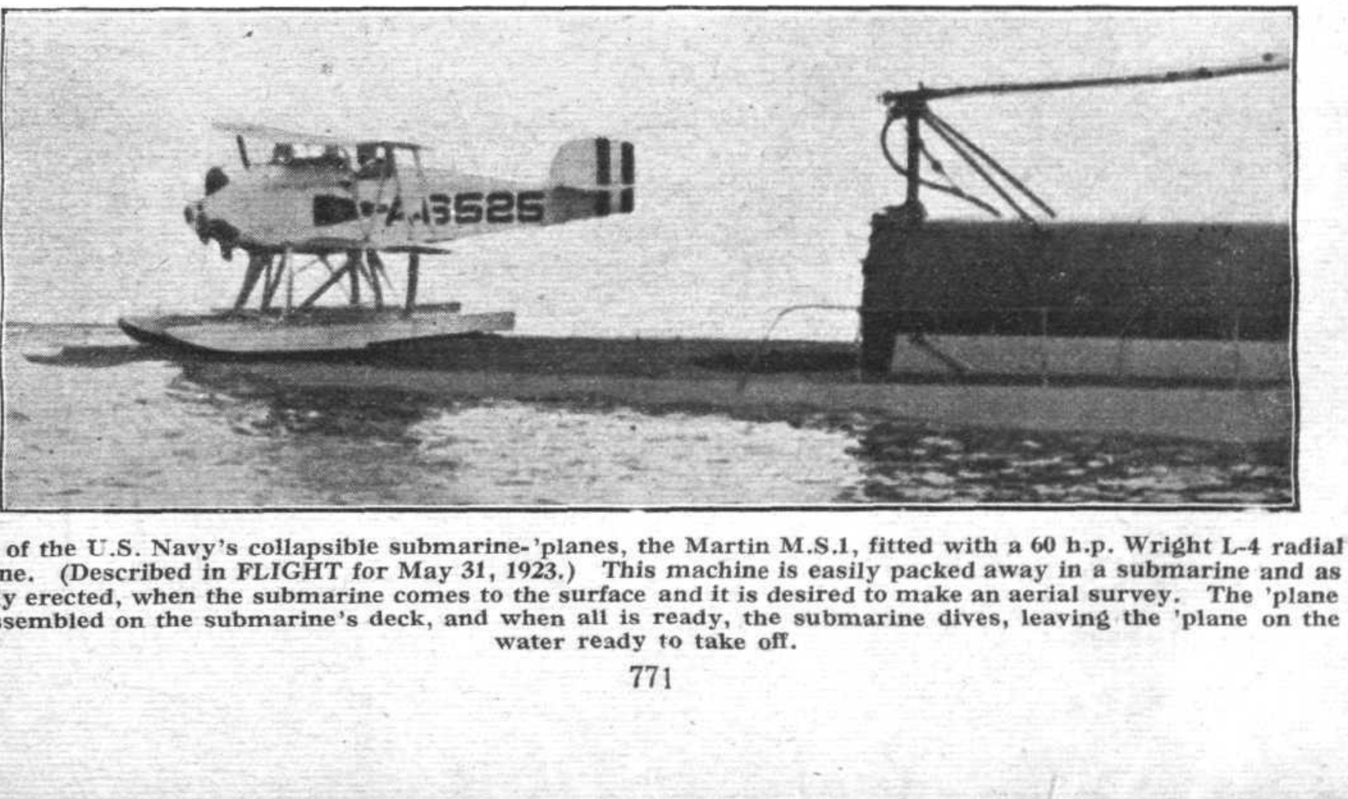
[**2080**] With reference to your suggestion that the gliding prize should be transferred to a competition for light aeroplanes, may I suggest that you use your influence with Messrs. Selfridge to extend the time limit to the end of 1924, in order to give the light aeroplane boom time to simmer down.

Gliders have, unfortunately, been in the background this year, but as the light aeroplanes become commercialised the scientifically inclined will lose interest in them.

The problem of soaring flight is still as fascinating as ever, and is still unsolved, and I trust you will not allow the subject to drop until the mystery is solved.

F. J. Chiverton

Southampton.



One of the U.S. Navy's collapsible submarine-'planes, the Martin M.S.1, fitted with a 60 h.p. Wright L-4 radial engine. (Described in FLIGHT for May 31, 1923.) This machine is easily packed away in a submarine and as easily erected, when the submarine comes to the surface and it is desired to make an aerial survey. The 'plane is assembled on the submarine's deck, and when all is ready, the submarine dives, leaving the 'plane on the water ready to take off.

BY DOUGLAS B. ARMSTRONG

Austrian Glider Post

PARTICULARS are to hand of a glider post organised in connection with the first Austrian light 'plane meeting, held at Waschberg, near Stockerau, from October 13 to 21. No aero stamps appear to have been provided, but there were two special cancellations and also a souvenir postcard employed. The first postmark was used by Viennese post offices as a form of propaganda for the event, consisting of the following inscription in a frame: "Erste Osterreichische Segelflugwoche Waschberg bei Stockerau 13-21 Oktober 1923." The second, emanating from the temporary post office on the flying ground, consisted of a concentric circle of two lines, enclosing between its circumferances the words: "1. Oesterr. Segelflugwoche 1923 X Waschberg bei Stockerau," with the date in the centre. Only 800 of the souvenir cards are said to have been printed by a Vienna firm, in a design representing an airship over the clouds, with the Austrian flag, but out of these only a small proportion was actually flown.

Mounting Air Post Covers

SOME useful hints on the mounting of air post covers, both for preservation and exhibition, are given by Lieut.-Col. H. W. Moffat in the December *Air Post Bulletin*. In the first place he emphasises the absolute necessity for some kind of protection, as a safeguard against deterioration through friction caused by the rubbing together of album leaves. He therefore recommends enclosing the entire cover in a damp-and-grease-proof transparent envelope, with the envelope flap cut off, and small projecting tags affixed to the cover itself, to facilitate its withdrawal for more minute inspection, etc.

In mounting the cover so that both sides may be inspected at will, it should first be placed on the album page and the corner positions marked in pencil. Next trim off the four corners of an ordinary envelope into four equal triangles and gum these slots in position, with the apex exactly on the pencilled dot. They then constitute a practical and convenient means of holding the cover, at the same time allowing it to be taken in and out for examination without damage to the album page. Alternatively, short stripes of transparent paper can be stuck diagonally across the four angles and the corners of the cover slipped underneath; but there is this disadvantage, that the cover is liable to slip from its moorings more easily, and the former method strikes us as being the most efficacious, as well as the most attractive.

Notes and News

THE Chinese air post service has been suspended for the winter months, but will be resumed in May next, between Pekin and Pei-taiho, when the special air post stamps are to be reissued in new colours.

It appears that there are four denominations in the latest Russian air stamp series, viz., 1, 3, 5, and 10 roubles, the design of which represents an aeroplane flying over the city of Moscow.

A curious and hitherto unrecorded air post cover is reported by Mr. Francis J. Field, and has, apparently, some connection with the Amundsen North Polar Expedition, though what is not quite clear. Addressed to the Aero Club of Pennsylvania, and bearing the Seattle postmark of June 3, 1922, it is franked with two 1 cent U.S.A. postage stamps affixed to a green and white "sticker," inscribed "AMUNDSEN NORTH POLAR EXPEDITION AIR MAIL," and is further impressed with a circular handstamp lettered "NORTH STAR X AIR POST."

Aero-collectors are cautioned against *reprints* of the excessively rare Ross-Smith souvenir stamps, which are said to be in existence.

Readers are invited to forward to the Editor of FLIGHT *letters, etc., bearing aerial stamps or postmarks for mention in this column, as well as out-of-the-way varieties, etc.*

We shall also be pleased to hear from correspondents interested in air-stamp collecting, and to answer any queries.

IMPORTS AND EXPORTS, 1922-1923

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; for 1920, see "FLIGHT" for January 13, 1921; for 1921, see "FLIGHT" for January 19, 1922; and for 1922 see "FLIGHT" for January 18, 1923.

	Imports		Exports		Re-Exports	
	1922.	1923.	1922.	1923.	1922.	1923.
	£	£	£	£	£	£
Jan. ..	1,152	466	76,552	60,079	23	280
Feb. ..	567	641	69,129	120,236	1,100	3,040
Mar. ..	1,471	589	166,607	71,945	100	689
April ..	3,846	8,508	139,995	167,757	5,880	462
May ..	2,416	845	167,999	55,427	4,254	728
June ..	816	1,433	129,137	141,381	14,530	1,410
July ..	1,039	192	24,405	62,025	—	1,334
Aug. ..	198	2,054	88,910	57,704	685	344
Sept. ..	3,043	578	71,508	39,069	44	106
Oct. ..	633	705	40,225	80,002	90	8,272
Nov. ..	52	1,246	203,437	55,001	450	250
	23,016	17,257	1,177,904	910,626	27,156	16,915

PUBLICATION RECEIVED

Aeronautical Research Committee, Reports and Memoranda: No. 877 (*E.* 6).—Tests of R.A.E. Gear Wheel Type Petrol Pump. July, 1923. London: H.M. Stationery Office, Kingsway, W.C. Price 6*d*. net.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motor
The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1922
Published December 20, 1923

23,504. J. D. NORTH. Light metal aircraft members. (207,279.)
27,029. S. H. ATTWOOD and RUSTON AND HORNSBY, LTD. Carburettor and ignition control. (207,321.)
27,549. J. D. NORTH. Structural members for aircraft. (207,329.)

APPLIED FOR IN 1923
Published December 20, 1923

3,517. WESTINGHOUSE BRAKE AND SAXBY SIGNAL COMPANY, LTD. Light signals. (202,948.)
7,538. SCHNEIDER ET CIE. Apparatus for gun mounting, etc., on aeroplanes. (195,371.)

FLIGHT

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36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.
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